NAEB

# Engineering Newsletter

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS

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## TV TECHNICAL TIPS (October)

—Cecil S. Bidlack

During the second week of September, I had the opportunity of visiting CBS Television City in Hollywood and both its kinescope and videotape recording installations. Consequently, I can give you a brief first-hand report of my observations.

CBS has five Ampex prototype videotape machines installed and in service. Since most of the West Coast television network programs are delayed, I had the opportunity of seeing VTR pictures in the control room and on the air. The picture quality is excellent although a light fine grain noise could be seen both in the control room and on my hotel room receiver. The amount of this noise varies with recording heads and with head life. However, the taped picture is a noticeable improvement over the kinescope recordings I saw in Los Angeles last October.

The problem of interchangeability has not yet been completely licked although progress is being made in the development of new recording heads. Lack of uniformity in different production runs of recording tape is still a problem although both head life and tape uniformity are being approved and 100 passes of the tape and comparable head life are being achieved. Due to the problem of interchangeability, when long delays of program material are encountered, the head and tape must be stored together for playback or a kinescope recording made as a protection copy. The revolving head and guide mechanism is changed as a unit. This can be accomplished in fifteen minutes when everything clicks.

A bulk erasing machine has been developed to erase videotape. The reel is placed on a spindle which revolves slowly as the reel of tape is moved slowly into and out of the field of a large degaussing coil. When the tape was erased by hand, no two operators secured uniformity of erasure. Now that the machine has been developed, uniformity is assured and no residual magnetism is left on the tape.

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In the kinescope recording room nine or ten machines (I lost count) are installed, both 16 and 35 mm. All recording is done double system. Mechanical shutters are used and sound tracks are recorded on quarter inch standard magnetic tape on Fairchild recorders. Two optical sound on film recorders are also available. Since the output of the recorders is negative film, network playback is from the negative picture. The sound track is played back on a Fairchild recorder which is synchronized with the picture.

An interesting facet of the film operation is that iconoscope film chains are universally used for all monochrome film playback. Through a patching panel any projector and its associated camera chain can be patched to any control room so that complete control of the projector is from the studio on the air. At present color film is shown on flying spot scanners although 3-Vidicon color film cameras are being installed since dense color film cannot be shown on the scanners. 35 mm. film is used exclusively, which give almost live film quality and excellent kinescope quality.

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Another network practice that, I'm sure, will be of interest, is the use of "protection" copies. ETV stations buy one kinescope recorder which is expected to produce results 100% of the time. I was present in the CBS kinescope recording room when a

program was being recorded. Four kinescope recorders (two 16 and two 35 mm.), two magnetic sound recorders and an optical recorder were used. No doubt a videotape copy was being made too, but that facility is located some distance away from the kine room. The same use of a "protection" copy is made on playback. I saw a videotape recording on the air backed up by a 35 mm. kinescope recording. They just don't take a chance of losing a program on the air - it costs them money.

Of course I realize that ETV stations don't have the funds or the personnel which are necessary for this type of operation. However, it does point up the fact that 100% reliability is difficult to achieve unless some such procedure is followed.

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Another operating practice which ETV stations can, and which many of you I hope are following, is that of showing " corners" on your image orthicons. If you're using second-hand camera tubes, then I realize you're limited because of previous scanning. But if you're using new tubes, don't be afraid to overscan them on the air. I was surprised to see "big, fat corners" showing on the live monitors which obviously had to be adjusted to show the entire raster. I was informed that this is standard operating procedure.

By following such a procedure, you get increased operating life, increased resolution because you are using more of the target, and if deflection drifts, the video control operator is aware of it. Yet, I have visited stations where there was no monitor adjusted so that the entire raster could be seen and no corners could be seen on the camera viewfinders. Consequently, no one knew how much they were underscanning the target.

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For these NAEB stations who have Magnecord PT6-A and PT6-J magnetic tape recorder combinations, factory modification information is now available which will bring these machines to conformity with those having NARTB approved response. The changes are simple for those PT6-J amplifiers that incorporate the 5881 output tubes and a 5879 input tube. We'll be glad to supply Thermofax copies upon request; or you can get the original by writing to Mr. Hugh J. Daly, General Sales Manager, Magnecord, Inc., 1101 South Kilbourn Ave., Chicago 24, Illinois. The schematic is on 8½ x 11 paper which makes some component values a bit hard to read on our copy. Necessary modifications for the PT 63-J and PT 6-BN will be made available later.

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A search through the files of these columns fails to disclose mention of an article in the SMPTE *Journal* for February 1955, "A Short History of Television Recording" by Albert Abramson. It contains an excellent bibliography on television recording. On writing to Mr. Abramson for permission to reprint his article, we discovered that the material it contains is taken from his *Electronic Motion Pictures*, published late in 1955 by the University of California Press. We suggest this book as recommended reading for any television engineer, for it is really a history of the television camera and contains a very complete bibliography on the development of television equipment and processes.

We had the opportunity of meeting Mr. Abramson who is employed by CBS-Television in Hollywood. He graciously conducted Merlyn Rawson and me on a very complete tour of the CBS Television facilities.

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"Is Portable Test Equipment Portable?" is the title of a short article in September 1957 *Electronic Industries and Tele-Tech*. It's a summary of a current test equipment study being conducted at the U.S. Navy Electronics Laboratory in San Diego. The military services have found that technicians frequently will not use certain items of test equipment simply because they are too large and bulky to carry easily.

The factors of weight, width, height and length were investigated. On the basis of this investigation, the maximum acceptable dimensions have been set at 8 inches wide, 18 inches by 18 inches long with a maximum acceptable weight of 14 pounds. It's good to know someone is making a study to determine what portable really means. Maybe this study will help break down the usual criterion of portability - "it has handles."

Much has been done in recent years to improve the design of radio and television equipment for field use. We can remember the old radio days when amplifiers, mixers and volume indicator meters were built as units on iron panels with audio transformers encased in iron cases and then packaged in oak cases an inch thick. Those too, were the days of battery operated amplifiers where you lugged a 6-volt A battery and 180 volts of B battery, also in a sturdy oak case, to the top of the stadium.

The present-day engineer can carry his transistorized amplifier and the rest of his equipment in a camera gadget bag or briefcase, ride to the heated press box in an elevator, plug the amplifier into the AC line, attach the broadcast line and he's ready to

check in on the business phone in the booth. "Good old days? Phooey."

—N A E B—

## TV TECHNICAL TIPS (November)

On September 19, the FCC amended Part 3 of its Rules and Regulations to permit remote control operation of AM and FM transmitters (Docket 11677) *including* non-commercial educational FM stations. All stations may be operated remote control regardless of power or whether directional or not. Since 1953, the FCC has permitted remote control operation for AM and FM stations using not more than 10kw and omnidirectional antennas. The Commission has *not* changed the rule requiring a first class operator to be in charge of stations operating with a power in excess of 10kw and with directional antennas. Applications for remote control will be considered on a case to case basis and the applicant will be required to show that transmitters and directional antenna systems are stable and in proper adjustment. Information submitted on stability will be obtained from an analysis of operating logs over a one year period and must include an outline of the maintenance practice of the station and the policy to be followed after remote control authorization.

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On October 2, the FCC adopted Docket 11896 which deletes section 3.182 (c) and the first sentence of footnote 1 to the table contained in section 3.182 (v) of the rules. These sections, commonly called the "unique service" rules, provided that when it is shown that primary service is provided by any station beyond its normally protected contour, and primary service to approximately 90% of the population of the area, between the normally protected contour and the contour to which the station serves, is not supplied by any other station or stations carrying the same general program service, the contour to which protection may be afforded will be determined on the facts in each case.

Comments opposing this action were filed by WBAA, WILL, KOAC, KWSC, WOI and NAEB, stressing the importance of protecting the program service rendered by educational radio stations beyond these station's normally protected contours and suggesting that if any action is called for the rules should not be abolished but should merely be clarified.

In deleting the rules the FCC stated that present provisions were too vague and indefinite to be of assistance in filing and processing of applications for new and improved standard broadcast facilities, that there was no satisfactory criteria for determining what constitutes the "same general program service" and that the "unique service" rule is an unsatisfactory allocation tool and should be dispensed with. The FCC also believes this amendment will encourage the establishment of more uniform, fixed allocation rules, thereby fostering a more effective AM broadcast service throughout the country.

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The August 1957 edition of RCA Broadcast News contains an eight page article on the State University of Iowa television studio. The article features the use of the studio as a Teaching Center for the Iowa Closed Circuit Television Teaching Experiment. It is well illustrated and details the equipment used and shows cut-away views of the TV facilities. It might be helpful to our readers who are planning television facilities.

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The Richmond Area University Center, Inc. Ellen Glasgow House, One West Main St., Richmond 20, Virginia is interested in purchasing a used 1 KW FM amplifier or transmitter for use at WRFK-FM. If you have this equipment for sale please contact Mr. Paul K. Keim at the above address.

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Vorce C. McIntosh has been appointed Chief Engineer, University TV and Radio, at the University of New Mexico, Albuquerque. He formerly was employed as an engineer at WTTW.

—N A E B—

GE is featuring John Cullen, Chief Engineer of KRMA-TV Denver, in its camera tube advertising in the trade press.

—N A E B—

## TV TECHNICAL TIPS (December)

Engineers at the University of Illinois have been busy this past month trying to beat the arrival of Old Man Winter. They've been making field strength measurements of both WILL-TV and WILL-FM. Their measurement method is patterned after TASO techniques which call for a 100-foot mobile run every two

miles along the radial at an antenna height of 30 feet. Our pictures this month show the unique and inexpensive way in which the measuring dipole is raised to the 30 foot height.

An RCA BW-7A VHF Field Intensity Meter and Test Set was used. The mast used is the same sectional 1¼" seamless tubing used for TV antennas. The measuring dipole is mounted normally on the insulating mast section which is furnished with the meter. This insulating rod is inserted in the mast tubing and clamped so as to place the antenna 30 feet above ground. A 4" channel is bolted on the back of the truck and the mast pivoted (as shown) at the top of this channel.

For normal travel, the mast is tied down horizontally at the front end of the panel van. When a measurement is to be made, these ropes are untied and the mast is raised by pulling down on the section extending beyond the rear of the truck. This end fits into the channel bolted to the rear of the truck and is fastened in the channel with wire or rope. A bolt through the mast enables the antenna to be oriented for maximum response. A short mobile run (100 ft.) is then made with the antenna at 30 feet. An average value of field strength is taken over this run as the measured field. The mast is then lowered and secured and they're off to the next measurement.

Rob Beldon, WILL chief engineer, says the mast and channel iron cost less than $15 including one mast which was bent before they decided that the bracing shown was necessary. The field intensity meter is mounted temporarily on a desk in the truck with power supplied by the truck battery. Beldon may be seen in front of the truck. If you look closely, Clarence Berbaum may be seen inside the truck and Al Saldeen could be seen at the right of the picture if we hadn't cropped it to fit the column.

The FCC also recently denied a petition which asked that UHF stations be permitted to broadcast music and other purely aural programs while telecasting still pictures and slides for a part of the broadcast day. The FCC rule is that television aural and visual transmissions must comprise integral parts of the announcement or program and have a substantial relationship with each other.

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The first production model of the Ampex Videotape Recorder is scheduled to be completed in November. Among the new features announced by Ampex are complete interchangeability of tapes among all production units and a means of editing the recorded tapes without loss of synchronization. Production models are priced at $46,000 and a delivery schedule set up earlier this year is expected to be maintained in spite of a strike which shut down production for a month this summer. Over 100 units have been ordered to date.

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An excellent paper on "Television Film Standards" was presented at the recent SMPTE Convention in Philadelphia. The authors are K. B. Benson and J. F. Whittaker of CBS Television in New York. In the paper, standards for control of the combined motion-picture and TV system are developed by an examination and correlation of the relationships between the two component processes and the effects upon the end product. It's a paper of interest to all TV engineers and will no doubt be published soon in the SMPTE Journal.

Included in the seventy four papers presented at this five day meeting was one by John R. Brugger, Chief Engineer of the Washington County Closed Circuit Television Network. John's paper covered a description of the equipment and the facilities used at Hagerstown.

While in Philadelphia we had the opportunity of visiting the studios of WHYY-TV and being conducted on a tour of their new facilities by Samuel Barbour, Chief Engineer. He reports that present programming from 9:00 a.m. to 3:15 p.m. is primarily for in school use. Programming will be expanded later to include evening hours. Reports of excellent reception on Channel 35 are very encouraging, Mr. Barbour states. WHYY-TV has a 12½ KW RCA transmitter with an ERP of 155 KW from a 500 foot tower.

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A television film camera for $89.50! That's what Merlyn Rawson paid for a surplus iconoscope camera which he has modified for use at the University of Southern California Telecommunications studio at Los Angeles. While the definition can hardly be called broadcast quality, (about 250 lines) this ike chain enables them to integrate film and slides with live pictures from the vidicon cameras used in teaching TV production.

The unmodified camera has free running oscillators and internal sync such that the video signal is suitable for feeding a monitor. However, the modification necessary to use standard RETMA pulses is very simple. A type 1846 iconoscope tube is used as the pick up tube. Since this is not available from stock, a spare camera tube was provided by purchasing a second camera. By the use of a simple mirror multiplexer, pictures from either a slide or film projector can be projected directly on the mosaic of the iconoscope.

The camera filaments operate from a 28 volt dc supply although instruction sheets furnished with the camera provide for AC operation by filament and plate rectifiers. A plate voltage of 400 volts at 175 mils is required as well as 50 volts of bias. This camera was built by RCA for aircraft use. We can tell you where it may be obtained on the West Coast although we've seen it advertised elsewhere. The data sheets mention this camera as belonging to the ATK or ATJ series although the heading is Television Camera CRV-59.

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A new list of available FM, and FM-AM combination receivers on the market has been compiled by Ray Cheydleur of WFSU-FM at Florida State University. They are including the list in their fall program bulletin recently released. With the thought that other FM stations may want to include the list in their program bulletin or offer it to listeners, Ray has supplied us with a number of copies of the list. We'll be glad to send it to you upon request.

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"Fundamentals of Light and Lighting," Bulletin LD-2 of the General Electric Company, is an 86 page text covering lighting terms, measurements, color systems and design fundamentals. Dick Lawson of the WILL-TV staff recommends it highly and uses it as a reference in his course work in TV production. If you'd like a copy, write to the Inquiry Bureau General Electric Co., Nela Park, Cleveland 12, Ohio. They also have available a multilithed list of lamps for studio and theatre spotlights and floodlights. It covers lamps for virtually all of the units in use in television studios. It might be helpful to our readers in selection of proper lamp types for studio use.

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"Operation Shoestring" a television project of the Schenectady Public Schools received considerable notice in the trade press last summer. A letter from Mr. Bernard F. Haake, Administrative Assistant, explaining the project, arrived too late to be included in the October *Newsletter*. Perhaps the point most emphasized last summer was that the system cost only $3000.00.

Mr. Haake states that they did not intend to imply that a complex closed circuit television installation could be obtained at this price. The purpose of the project was to place minimal equipment in the hands of teachers so that they could become accustomed to working with it. The teachers did use the equipment, and now regard television in the same light that they regard a tape recorder or movie projector.

The equipment used a GPL vidicon camera and monitor, which fed used television receivers purchased for the project and installed in three rooms adjacent to the transmitting classroom. Speakers were borrowed from film projectors to supply audio and room lighting was supplemented by photo floods in the "studio."

Mr. Haake believes that many school systems would be willing to spend $3000, as they did, to become familiar with this new medium and to see for themselves that it has application and value to education. Then they might be willing to consider more elaborate systems involving perhaps $40,000 to equip a high school of 2000 students.

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Merry Christmas and a Happy New Year

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